

# Grade Grabber 2

40 Mark Paper

## Question 1

Factorise completely

(i)

$$14x + 21$$

[ 1 mark ]

(ii)

$$x^2 + 11x + 28$$

[ 2 marks ]

(iii)

$$x^2 - 49$$

[ 2 marks ]

## Question 2

Solve the following simultaneous equations

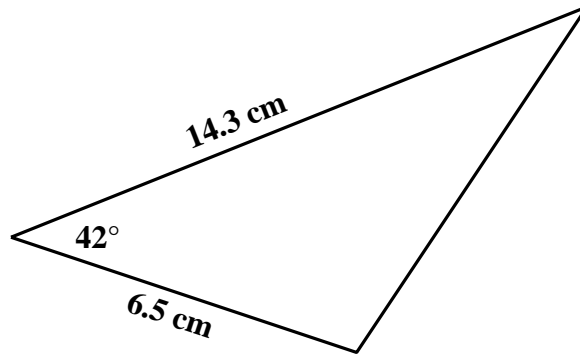
$$4x + 3y = 3$$

$$5x + 6y = 15$$

[ 4 marks ]

### Question 3

- (i) Archie has read that the formula  $Area \Delta = \frac{1}{2} a b \sin C$  can calculate the area of a triangle. Write down how Archie should use the formula to calculate the area of the following triangle;



- (ii) Also, write down how Archie could use the following formula [ 2 marks ]
- $$c^2 = a^2 + b^2 - 2ab \cos C$$
- to calculate the length of the triangle's unknown side.

[ 2 marks ]

### Question 4

On 1st March 2021 it was reported on the Zoopla website that house prices in Shrewsbury had increased, on average, by 3.3 % in the past year.

What would this statistic predict that a house, which was bought for £380,000 on 1st March 2020, is worth on 1st March 2021 ?

[ 2 marks ]

**Question 5**

Two functions,  $f$  and  $g$ , are defined as follows;

$$f(x) = 3x + 8$$

$$g(x) = 5x$$

(a) Evaluate

(i)  $f(13)$

[ 1 mark ]

(ii)  $g(17)$

[ 1 mark ]

(iii)  $g g(4)$

[ 1 mark ]

(iv)  $f g(10)$

[ 2 marks ]

(b) State the value of  $x$  for which  $f(x) = 0$

[ 2 marks ]

(c) Determine the inverse of the function  $f(x)$

That is, find  $f^{-1}(x)$

[ 2 marks ]

### Question 6

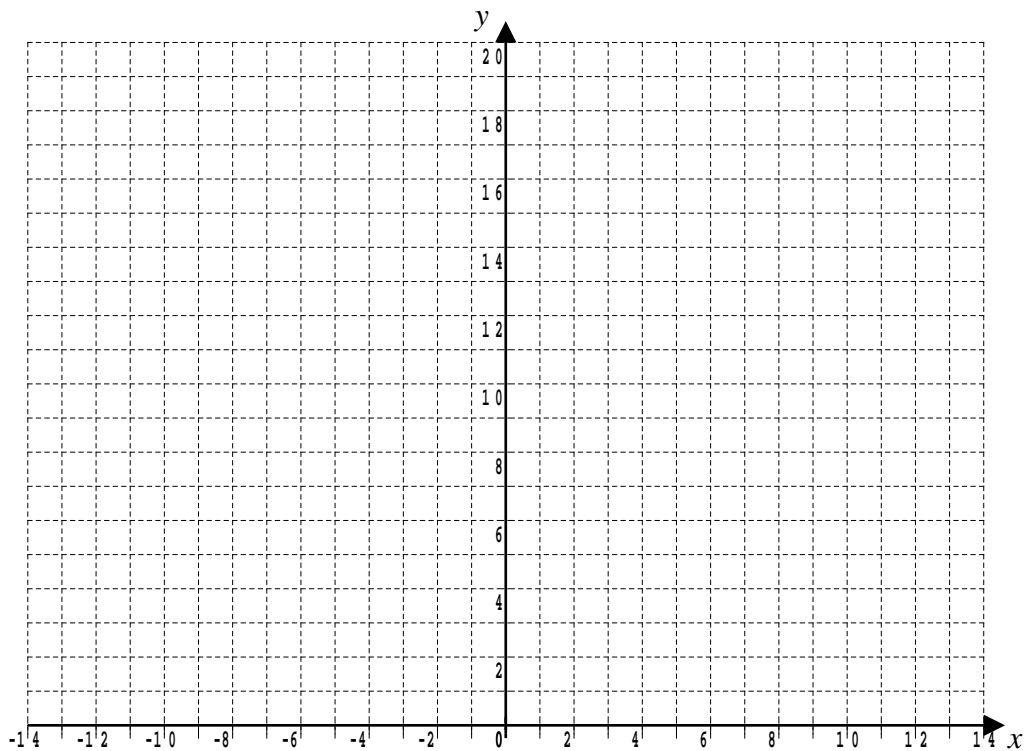
Below is a partly completed table for the graph of  $y = 0.125x^2$

$x$	-12	-8	-4	-2	0	2	4	8	12
$y = 0.125x^2$		8							

(i) Complete the table by filling in the missing values of  $y$

[ 2 marks ]

(ii) Plot these points and join them with a smooth curve



[ 2 marks ]

(iii) On your graph add the line  $y = 10$

[ 1 mark ]

(iv) From your graph, write down the approximate values of  $x$  where the line intersects the curve

[ 2 marks ]

(v) Determine a more accurate answer to part (iv) by solving the equation

$$0.125x^2 = 10$$

[ 2 marks ]

**Question 7**

- ( a ) Expand the brackets;

$$(3x + 4)^2$$

[ 2 marks ]

- ( b ) The hypotenuse of a right angled triangle is of length  $3x + 4$  cm and the lengths of the other two sides are  $3x + 3$  cm and  $x$  cm

- ( i ) Use the theorem of Pythagoras show that the relationship between  $3x + 4$ ,  $3x + 3$  and  $x$  can be expressed as;

$$x^2 - 6x - 7 = 0$$

[ 3 marks ]

- ( ii ) Solve your equation and hence state the lengths of each of the three sides of the triangle.

[ 2 marks ]